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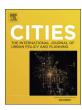
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# Under pressure: Factors shaping urban greenspace provision in a mid-sized city



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## ABSTRACT

Urban greenspaces provide diverse ecosystem functions, services and benefits to residents. Much commentary has been offered to date about citizens' demands for more urban greenspace. Less attention, however, has been given to the 'supply side' pressures experienced by local government in delivering urban greenspace, particularly in mid-sized cities. Greater attention to factors shaping supply is warranted, especially in the context of rapid population growth. By understanding how existing greenspace provision approaches can stymie the efforts of local government to meet citizens' needs, new approaches can be identified. This paper assesses several factors shaping urban greenspace provision in Surrey - a city within the Greater Vancouver area. Insights are derived from in-depth interviews with key stakeholders, public documents, and census and municipal data about parks and their context as a specific type of greenspace. Our findings suggest that governance tools, economy and property markets, and financial and natural resources manifest as core factors influencing urban greenspace provision in Surrey. A reliance on governance tools premised upon standards has created park provision paradoxes. Treating greenspace provision as a largely technocratic exercise may be limiting Surrey's ability to respond to changing politics, economics and population trends. We point to alternative approaches.

# 1. Introduction

Once conceived as the domain of the gentry, parks and greenspace are now being reconceptualised - and advanced - as solutions to multiple urban problems (for example, social integration, stormwater attenuation, and health promotion). Adequate greenspace provision has emerged as one of the most important policy challenges facing cities across the world (Haaland & van den Bosch, 2015; Kabisch, 2015; Richards, Passy, & Oh, 2017; Wolch, Byrne, & Newell, 2014). Globally, concerns with public health are driving renewed interest in parks, street trees, and other forms of greenspace for their positive physical and mental health outcomes (De Vries, Verheij, Groenewegen, & Spreeuwenberg, 2003; Kardan et al., 2015; Mitchell & Popham, 2007). Greenspaces are increasingly regarded as essential urban infrastructure that can provide diverse ecosystem functions, services, and benefits. Indeed, greenspace is now increasingly seen as instrumental for mitigating climate change impacts (including urban heat islands, flooding) and as a biodiversity refuge (Byrne, Lo, & Jianjun, 2015; Gill, Handley, Ennos, & Pauleit, 2007; Maimaitiyiming et al., 2014). A key consideration here is whether existing approaches for park provision can meet these diverse demands. The answer partly depends on how approaches to provision are attuned (or not) to the contemporary political, economic, social and environmental challenges facing cities.

In their systematic review of the literature on urban greenspace provision and supply, Boulton, Dedekorkut-Howes, and Byrne (2018) observed that the most often reported purpose of greenspace is recreation - regardless of greenspace type. Other urban greenspace purposes include environmental (e.g. drainage, climate mitigation), social (e.g., amenity, health, food production, culture and heritage), and economic (e.g., transport) purposes. Dilemmas for municipal urban greenspace managers arise when attempting to satisfy these multiple demands with limited resources - especially financial ones (Ordóñez et al., 2019). To date, research examining the spatial challenges of supplying urban greenspace has mostly focused on issues related to its accessibility (such as Fan, Xu, Yue, & Cen, 2017; Rojas, Páez, Barbosa, & Carrasco, 2016; Stessens, Khan, Huysmans, & Canters, 2017) and availability (Kabisch, Strohbach, Haase, & Kronenberg, 2016). The complex systems and processes that determine how and when resources are allocated to urban greenspace are comparatively under-assessed. The experiences of park planners and managers 'at the coalface' of

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delivering municipal urban greenspace within the constraints of competing municipal services and infrastructure, such as roads and stormwater is understudied (with the notable exception of Meerow and Newell (2016, 2017)). What are the pressures associated with fast-paced urban development to support rapid population growth? This paper takes up the task of addressing these significant gaps in the literature by providing an 'insider's perspective' to urban greenspace provision.

Our study has sought to better understand how the complex challenges of providing urban greenspace are negotiated by local government, and to some extent the broader community in fast-growing cities. We employed a qualitative case study approach to examine two key questions: 1) what factors shape urban greenspace provision at the local scale? and 2) how are these factors resolved? We address these questions in turn. Following a review of the scholarly literature about the factors that most influence urban greenspace, we describe our research method and case study area. We then synthesise the key findings about the factors influencing local government urban greenspace provision. We discuss our findings in the context of emerging themes and point to some important implications for urban policy and planning practice. We conclude by identifying some research limitations and propose directions for future research.

# 2. Literature review

A recent review of the academic literature focused on the provision of urban greenspace (Boulton et al., 2018) revealed a range of factors at play, including governance tools and structures, resources (natural, financial and human), leadership (political and organisational), community engagement, markets and economies. The literature as explained below, suggests that these factors manifest themselves in different ways in different contexts, depending on variables such as the pattern of urban development, city size, and the involvement of not-for-profit organisations.

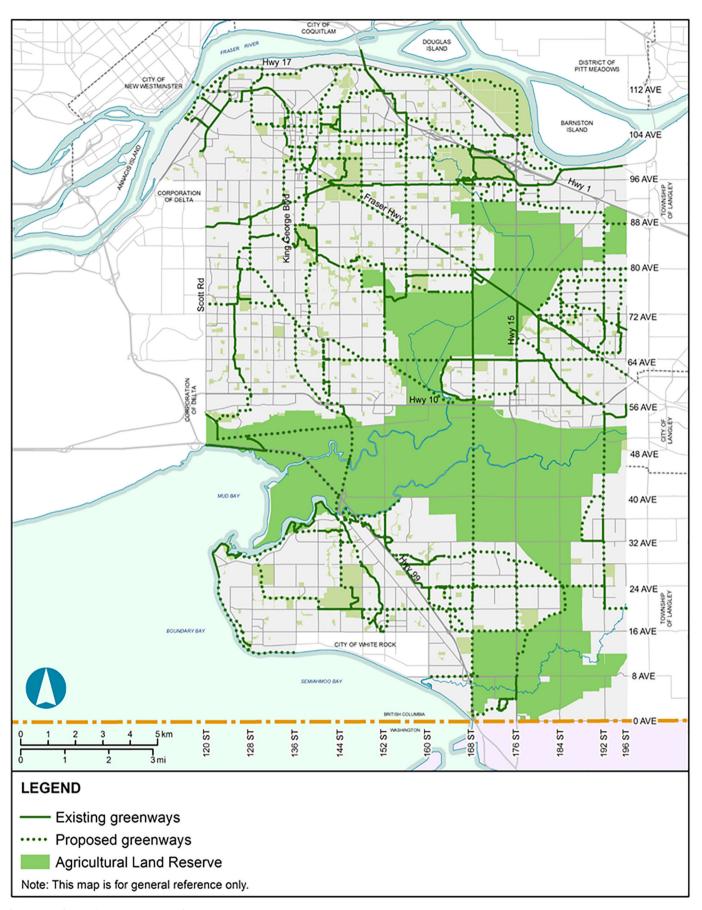
In the broad sense, urban greenspace governance concerns "the processes, interactions, organisations, and decisions"; that is, the "complex area of human organisation and behaviour" (Lawrence, De Vreese, Johnston, van den Bosch, & Sanesi, 2013, p. 464). And, in their review of trends in urban forestry governance (as a sub-set of urban greenspace types), Lawrence et al. (2013) offer a framework comprising: context, institutional framework, actors and coalitions, resources, and processes. In a similar vein, Tacconi (2011, p. 240) defines environmental governance as "the formal and informal institutions, rules, mechanisms and processes of collective decision-making" highlighting its role in facilitating stakeholder influence and engagement. Urban greenspace governance therefore comprises tools (policies, planning instruments and regulations) that help demonstrate the vision, purpose, and delivery goals of primary stakeholders (government and non-government) to other stakeholders involved in and/or concerned with greenspace provision (Lawrence et al., 2013). Planning instruments are often cited for their role in facilitating - or in some cases frustrating - urban greenspace provision and their alignment with policies for urban growth, densification, and green infrastructure, especially at the local scale (Byrne, Sipe, & Searle, 2010; Davies & Lafortezza, 2017; Haaland & Van Den Bosch, 2015). Governance tools therefore need to be context-based and politically informed for decision-making about urban greenspace provision in a local setting. The most cited tools are the use of area-based and distance-based standards; many cities continue to rely on park standards such as provision ratios and percentages of land proposed for subdivision (Harnik, 2010; Jim,

Resources shaping urban greenspace provision include natural resources, knowledge, information, and funding as well as delivery mechanisms, as recognised by Lawrence et al.'s (2013, p. 471) urban forestry governance framework. Studies to date have demonstrated that the availability and allocation of natural resources is fundamental to

achieving greenspace provision. For instance, the quantity of greenspace within Hong Kong's urban footprint is exceptionally low when compared with other large Chinese cities, due to the highly constrained geography of the city (steep vegetated slopes), high cost of land, and the extent of urban development (Lo & Jim, 2012; Tang & Wong, 2008). In some rapidly growing cities, flood-prone lands (De Sousa, 2003) and brownfield sites - including abandoned rail corridors and airports have been adapted to public greenspace (Kabisch & Haase, 2014). Funding cuts for municipal service provision, including parks, have meant reduced resources (staff and financial) for park maintenance in Europe including Berlin (Rosol, 2012), the United Kingdom (Dickinson, Bennett, & Marson, 2019; Mell, 2018), and Denmark (Molin & van den Bosch, 2014). In the USA, residents of Los Angeles County with limited access to urban greenspace, have been further disadvantaged compared to other parts of the metropolis where not-for-profit agencies are effectively mobilised to secure limited grant funding to improve greenspace provision for residents (Wolch, Wilson, & Fehrenbach, 2005). In Milwaukee, residents' access to public greenspace has been diminished through the sale of parkland for housing development by commercial enterprises, out-sourced park management to non-profits, and commodification of community gardens (Roy, 2011). Resources associated with urban greenspace provision have therefore been found to be highly influential, especially those that are natural (availability of suitable land) or financial (capital funding for land acquisition, facility development, maintenance, operations, and programming).

Provision of urban greenspace is strongly shaped by markets and economies - from global to local scales, with socio-spatially differentiated outcomes. For instance, Watson (2009) has observed that the impact of markets and economies on cities rarely benefits or engages socio-economically disadvantaged communities. Similarly, Vinodrai (2015) has noted scholars' concerns about amplified social disconnections between the creative and working classes within the emerging knowledge-based, creative economies, Coiacetto (2009) has also reported the complexities of property markets and the development industry, including the reliance on funding (loans) which can be difficult to access and can frustrate delivery of new urban infrastructure especially targeted for community purposes. Development interests at a global and national scale (for example, investor appetite for risk) can determine greenspace provision at the local level, with paradoxical outcomes. In Hermosillo, Mexico for example, financial in-flows, rather than city planning policy, shaped development and services provision in comparatively (dis)advantaged neighbourhoods, despite the need to address inequitable distribution (Lara-Valencia & García-Pérez, 2013). Similarly, property development in Japan has resulted in greater access to urban greenspace for more affluent residential areas of Yokohama (Yasumoto, Jones, & Shimizu, 2014). And in the Middle East, global markets driving oil and gas production impelled rapid urbanisation and diminished urban greenspace provision for some Greater Doha residents (Hashem, 2015). Development activity therefore often has an impact on the availability of financial resources for urban greenspace provision and who benefits from the in-flow of such resources.

This concise review suggests that urban greenspace provision depends predominantly on adequate governance tools and available resources. This is especially true for small to mid-size cities (Boulton et al., 2018). Limited financial support and comparatively reduced global investment mean such cities experience the challenges of urban growth more acutely. The net result can be reduced greenspace provision especially for densifying cities (Haaland & van den Bosch, 2015). Yet there is presently a gap in the scholarly knowledge about how urban greenspace is provided in mid-sized non-capital cities, a gap that our research aims to address. To answer our earlier questions, we conceived a case study research design that sought to illuminate the perspectives of urban greenspace managers, planners, and decision-makers (internal and external to the local government) supported by documentary evidence.



**Fig. 1.** City of Surrey's greenways network. Source: City of Surrey, 2014:138.

#### 3. Methods

We undertook a case study of a local government area to examine the phenomenon of urban greenspace provision using qualitative methods. Drawing upon the lead author's experience over a decade as a municipal greenspace manager, themes and concepts were initially developed about the factors that shape urban greenspace provision. These themes and concepts were evaluated and refined against the academic literature to establish a framework of factors for testing through the case study. The selected case study site is a mid-size, noncapital city experiencing rapid population growth and urban densification, on the periphery of a major metropolitan region. As the central data source for our case study, in-depth interviews were conducted about urban greenspace provision, supported by relevant public documents drawn from municipal plans, policies, and strategies (current as of April 2020).

Interview participants with either a role or a demonstrated interest in the provision of urban greenspace in the case study area, were identified from a purposive sample of 32 potential interviewees. A total of 19 participants were interviewed by the lead author between April and June 2018, using 10 open-ended questions (Appendix A). The interviewees were classified as one of five types: Community Representatives (residents and local academics) (n = 5), Elected Officials (politicians) (n = 2), Executive Managers (n = 2), Managers (n = 7) or Officers (n = 3), and assigned a unique numerical identifier for anonymity. In terms of their familiarity with our case study area, interviewees had either been employed by the municipality, were a resident or an academic researcher with a demonstrated interest in our case study area and/or its citizens, or had provided service to the municipality. Our interviewee profile was mostly male (n = 14) senior employees with extensive experience (Executive Managers, Managers, and Community Representatives with a range 8 to 25 years; Officers with a range of 8 to 10 years; citizens or researchers in the region with a range of 3 to 70 years). Interviews were conducted in multiple locales including: municipal offices, a public library meeting room, on a university campus, or in the case of some retired interviewees, in their home. The average duration of the interviews was 46 min (ranging from 34 to 63 min), which were captured using two digital voice recorders. Recordings were transcribed using an online digital voice-to-text transcription service (Temi.com), manually edited by the interviewer, then provided to each interviewee for confirmation and editing as desired, prior to analysis.

Interview transcripts in the first instance were analysed using Leximancer (Version 4.51) as a visual-first analytic method. Leximancer facilitated inductive thematic analysis - identifying prominent themes and concepts, and their relationships to each other, within the central research focus of urban greenspace and park provision, and consistent with its application by Angus, Rintel, and Wiles (2013) and Sotiriadou, Brouwers, and Le (2014). Using NVivo Professional (Version 12), interview transcripts were then coded to further examine prevalent themes, emerging issues, and predicted factors influencing greenspace provision (Appendix A). Descriptive codes were prepared as a theorydriven approach using content analysis (Churchill, 2013; DeCuir-Gunby, Marshall, & McCulloch, 2011); codes were applied at both implicit and explicit levels (Sproule, 2006). Consistent with previous greenspace provision research (for example, Davies and Lafortezza (2017) and Roy (2011)), documentary materials were sourced as secondary data to triangulate the in-depth interview data. These included relevant municipal and provincial legislation, policy instruments, relevant excerpts from local media (Churchill, 2013; Cope, 2010), as well as census and municipal data.

# 4. Urban greenspace provision in Surrey, Canada

#### 4.1. Context

Surrey is a Canadian non-capital city, experiencing fast growth. The city is part of a larger urban metropolitan region with a municipal government that seemingly celebrates and values significant urban greenspace provision. Located within the Greater Vancouver Regional District, Surrey is approximately 25 km southeast of Vancouver, bordering Washington State, USA to the south. With a local government area of 324 km<sup>2</sup> (City of Surrey, 2016) Surrey is spatially the largest municipality within the Greater Vancouver Regional District and is characterised by six distinct urban centres: Whalley, Guildford, Newton, Fleetwood, Cloverdale, and South Surrey. Approximately one third of the city's area is within the 4.7 million-hectare Agricultural Land Reserve comprising public and private lands that can be farmed, forested or remain vacant (Diamond Head Consulting Ltd., 2014; Wiese, 2007) (Fig. 1). Outside of the Agricultural Land Reserve, Surrey's Urban Containment Boundary is "consistent with Metro Vancouver's Regional Growth Strategy 2011" (City of Surrey, 2014, p. 66). While Vancouver has attracted considerable attention for its urban policy and development, much less is known about the municipal areas in Vancouver's shadow - those neighbouring municipalities arguably shouldering the burden of urban growth (see Holden & Scerri, 2013). Surrey is also one of Canada's fastest-growing municipalities (see Fig. 2) with an annual average growth rate of 2.12% between the most recent census years (2016 and 2011) and the fastest growing municipality in the Metro Vancouver region (City of Surrey, 2017). The current estimated population of 557,310 (City of Surrey, 2020) is forecast to reach 770,200 by 2046 (City of Surrey, 2016) at a projected annual growth rate of 1.62%.

Surrey's 2041 Vision is of "a greener, more complete, more compact and connected community that is resilient, safer, inclusive, healthier and more beautiful" (City of Surrey, 2016, p. 5) than the present day. "Infrastructure and Facilities" are key to Surrey's Official Community Plan, including recreation facilities, parks and greenways (see Fig. 1) that "knit Surrey and its neighbourhoods together" (City of Surrey, 2016, p. 46). Greenspace provision for Surrey is based on the aspirational goal of a park area provision ratio of 4.2 ha per 1000 residents, supported by a walkshed/travel-shed of 400–600 m from multi-family residences (City of Surrey, 2014, p. 135). Council's Parks Division (part of the Parks, Recreation and Culture Department) is responsible for Surrey's municipal urban greenspace provision including planning, research, design, capital works delivery, operations, maintenance and programming (City of Surrey, 2018b).

With 3006 ha of parkland to serve the residential population in 2016 (City of Surrey, 2019), Surrey was exceeding its goal of 4.2 ha of parkland per 1000 residents in 2016 by 1 ha per 1000 residents (City of Surrey, 2016, p. 49), even before including the non-municipal and other greenspace provided by Metro Vancouver and the Province of British Columbia. However, the pace of population growth has exceeded the rate of parkland acquisition, opening a gap that has steadily widened for almost a century (Fig. 3). Curiously, Surrey has generally managed to achieve a provision ratio ranging from 2.9 to 7.7 ha per 1000 residents over these decades (Fig. 4) despite a decline when resources were scarce during global crises of wars and the Great Depression during the early half of the 20th Century. Urban greenspace provision in Surrey was later spurred on in the first instance by legislative amendments to establish a Parks Commission (1948), appointment of a Recreation Director (1949), a Parks Administrator (1954) (Treleavan, 1972) and again in the 1990s at a time that coincided with Surrey being declared "A City of Parks" (Robert Bose, personal communication with lead author, 18 June 2018). At face value, this suggests that Surrey is highly 'effective' at keeping pace with an aspirational standards for urban greenspace, where 'effective' implies actively acquiring more land for parks in pursuit of the aspirational target (4.2 ha per 1000 residents). This prompts several questions about the approach to urban

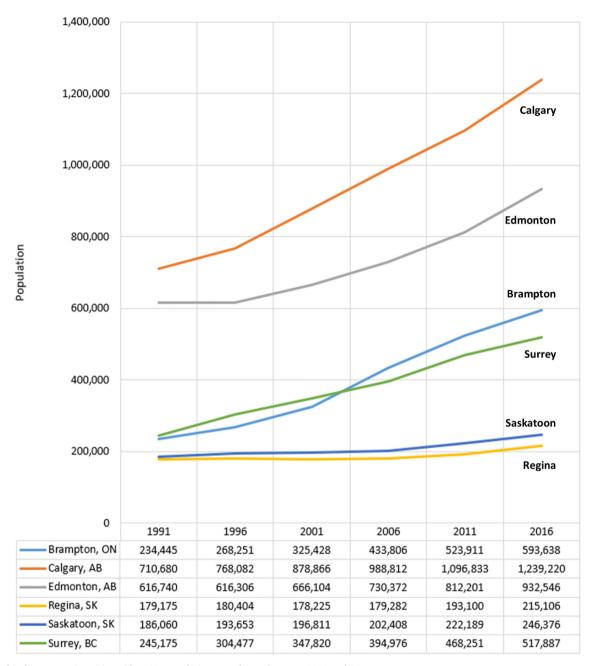


Fig. 2. Canada's fastest growing cities with > 2% population growth rate between 2011 and 2016 census. Source: Statistics Canada, 1991, 1996, 2001, 2006, 2011, 2016.

greenspace provision in Surrey, such as: what does this goal accomplish; is this the only measure employed to determine effective urban greenspace provision; and are other criteria considered?

There are already some early signals that continued population growth fuelled by high in-migration, is potentially undermining Surrey's success with urban greenspace provision in maintaining and even exceeding the target ratio of parkland to residents. For instance, Surrey's once minimum target of 4.2 ha per 1000 residents (City of Surrey, 1996) has now transitioned into an aspirational goal in responding to the mounting pressure to provide urban greenspace in the face of rapid growth (City of Surrey, 2014). The benefit of having a provision ratio as an aspirational goal for Surrey is that it still provides a clearly defined vision for urban greenspace provision as a metric for reporting performance to the community. While there are some positive outcomes of striving for a larger quantity of parks this also raises some questions. At what cost to the quality of Surrey's collective urban

greenspace, longer term maintenance, and park programming do more parks come? Are these under threat with realising an urban greenspace target? Despite the pace of growth, rate of urban development, and likely inflow of economic resources to support new infrastructure from such investment, is Surrey weakening in its ability to deliver urban greenspace? What caused Surrey's decision to change course from 4.2 ha per 1000 residents as a minimum target to becoming an aspirational goal for urban greenspace provision? Kotter (2008, p. viii) suggests that success often delivers complacency; complacency is the opposite of urgency which is at the heart of leading change in "making a challenging leap into some new direction". In search of some revelations to this perplexing conundrum, we now turn to the perspectives from some of Surrey's key players in the urban greenspace realm to determine if Surrey is indeed facing an emerging crisis, and in doing so, we examine what factors scaffold, and perhaps threaten, the City's greenspace achievement.

Total Hectares ..... Linear (Population)

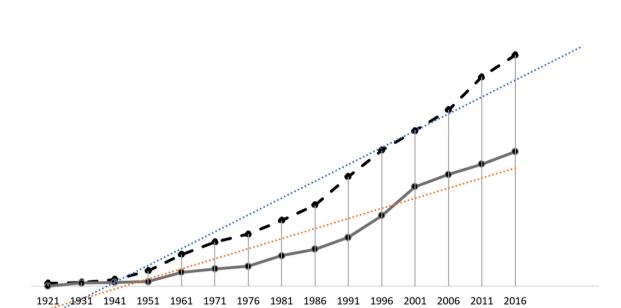


Fig. 3. Growth rates of population and parkland area in Surrey, Canada, 1921-2016.

1971 1976 1981 1986 1991 1996 2001 2006 2011 2016

## 4.2. Factors shaping urban greenspace provision

Six prominent themes and multiple concepts that help explain urban greenspace provision in Surrey emerged from our analysis of the interview data using Leximancer (see Table 1). The analysis suggests that the themes of urban greenspace and parkland (our research focus) are related to several other themes comprising one or more concepts: local government, property development, budgets, Surrey and its citizens, municipal administration, and the elected council (Fig. 5). Our analysis revealed these themes in three clusters: 1) urban greenspace, parkland, and local government; 2) budgets and, property development; and 3) Surrey and its citizens, the municipal administration, and the elected council. In this case, the budget and property development themes both clustered together and sit more closely to 'urban greenspace' and 'parks'. The remaining themes of elected councils, municipal

1951 1961

Population

administration, and Surrey and its citizens, were likewise clustered, yet with greater distance from urban greenspace and parkland. It is the core factors (budgets and property development) that are more directly linked to and in closest proximity to urban greenspace and parkland that we examine here.

······ Linear (Total Hectares)

Further analysis of the interview data in NVivo revealed multiple factors of influence that include resources, governance (tools and structure), community expectations, economy and markets, political leadership, community expectations and organisational culture, among these themes and concepts. Consistent with Boulton et al. (2018) interviews revealed that proportionally, resources and governance tools were the prominent factors determining urban greenspace provision. Property market and economies, governance structure, organisational culture, and political leadership likewise were evident. 'Community expectations' was also a dominant factor that emerged from our case

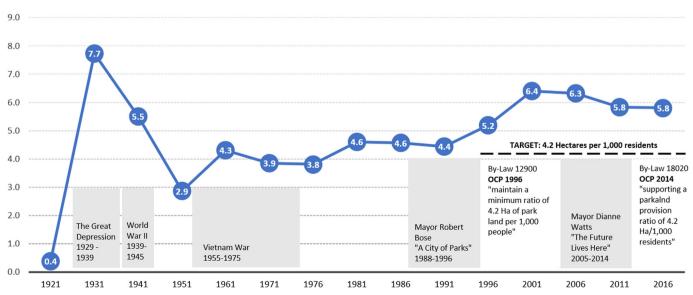


Fig. 4. Trend in ratio of parkland to residents (Hectares/1000) in Surrey, Canada, 1921-2016.

Table 1
Frequency of themes and their associated concepts identified in Leximancer and factors shaping urban greenspace provision in Surrey, Canada from interview data.

Theme	Concepts		Count	Related Factors
Surrey and its citizens	Surrey	Natural	971	Community Expectations
-	Down	Lots		Resources (Natural)
	City	Trees		
	People	Place		
	Probably	Kinds		
	Area or areas			
Parkland	Park or parks	Better	919	Resources (Natural)
	Provision or provide	Need		
	Level	Neighbourhood		
	Different	· ·		
Property development	Land	Need	707	Governance Tools
	Plan	Cost		Property Market & Economy
	Having	Use		Resources (Financial & Natural)
	Able	Public		
	Community	Doing		
	Development	· ·		
Urban greenspace	Green	Important	474	Resources (Natural)
	Open	Urban		
	Better			
	Space or spaces			
Municipal administration	Work or Worked	Long	246	Governance Structure
	Change	Time		Organisational Culture
	Down	Sure		Political Leadership
				Resources (Human)
Budgets	Money	Year	100	Governance Tools
	Buy	Development		Property Market & Economy
	Land	Cost		Resources (Financial & Natural)
	Plan or Planning	Funding		
Local government	Local	<u> </u>	100	
Elected council	Council	Change	97	Political Leadership
	Saying	Try or Trying		Community Expectations

study data (see Fig. 6).

Overall, our findings indicate that governance tools (planning legislation and policy), financial resources (budgets and money), and property development (including the property market) were distinctly at the heart of urban greenspace provision in Surrey. It is these factors which are essential to realising and enabling its lawful delivery, which we therefore refer to as the *core* factors (Fig. 7). In order to provide a comprehensive and in-depth discussion of this group of factors identified, we have focused solely on the *core* factors in this article with the remaining *supporting* factors to be reported separately. We now address each of these core factors in turn.

# 4.2.1. Planning: legislation and policy

Interviewees reported a range of governance tools that shape urban greenspace in Surrey, stemming from the provincial level. Central to these tools is British Columbia's Local Government Act, the primary legislation providing the means of planning and financing service delivery for municipalities at both regional and local levels. Surrey's urban greenspace provision is also shaped by the Metro Vancouver Regional Growth Strategy mandating the Urban Containment Boundary (Metro Vancouver, 2017). The Local Government Act also underpins Metro Vancouver's provision of several regional greenspaces including Tynehead Regional Park (261 ha) and Surrey Bend Regional Park (348 ha) (Greater Vancouver Regional District, 2004; Metro Vancouver, 2010). However, Manager 7 reported that Surrey traditionally has not included these two Metro Vancouver parklands in their inventory "all of which add very substantially to parkland provision in Surrey", and hence explains how Surrey is maintaining a high provision ratio (Fig. 4) despite a widening gap between population growth and parkland acquisition (Fig. 3).

In British Columbia, municipalities are required to obtain public approval under certain circumstances including 1) borrowing money for major projects (s.179 Community Charter and s.406 Local Government Act) and 2) disposing of land (s.27 Community Charter and s.281 Local

Government Act) (Province of British Columbia, 2003, 2015, 2018). The few participants that identified a referendum (also known as 'Assent Voting' - see Province of British Columbia, 2018) as a governance tool, spoke positively about its impact on Surrey's urban greenspace provision. Officer 3 and Elected Official 1 each spoke of the value this legislation offered in protecting parks from disposal or amended use exemplified by the cases of Sunnyside Acres and Green Timbers Urban Forest. Elected Official 1 offered that "to remove a park from dedication you have to conduct [a] referendum and that would require the vote of all Surrey residents... a referendum on parks is... avoided at almost all costs because... they could [not] succeed. People value the parks". As progressing proposals for parkland acquisition, facility development or parkland disposal is at Council's discretion, Council runs the risk of potentially exposing council intentions that may be contrary to community expectations.

Surrey's policy instruments - by-laws and resolutions - include the Official Community Plan as well as other documents formally adopted by a Council vote (Union of BC Municipalities, 2015). Surrey's 2725-ha park system (City of Surrey, 2017) is therefore provided in accordance with the Official Community Plan (City of Surrey, 2014), informed by strategic plans including Parks, Recreational and Culture Strategic Plan 2018-2027 (City of Surrey, 2018b), Biodiversity Conservation Strategy (Diamond Head Consulting Ltd, 2014), and Greenways Plan (City of Surrey, 2012). Surrey's Official Community Plan provides for city parks, community parks, neighbourhood parks, nature preserves, and habitat corridors (City of Surrey, 2014, p. 131). Surprisingly, despite its title, the Greenways Strategy (Fig. 1) was seldom mentioned in the context of the City's urban greenspace provision. Officer 1 attempted to explain: "It [is] a network that allows people to make green choices in terms of how they move around the city. They [are] not necessarily 'green' from a landscape point of view." Most interviewees at least correlated biodiversity with urban greenspace. Officer 2 and Officer 3 reported that biodiversity had recently been incorporated in the Parks Recreation and Culture Strategic Plan 2018-2027 (City of Surrey, 2018b) as a type of

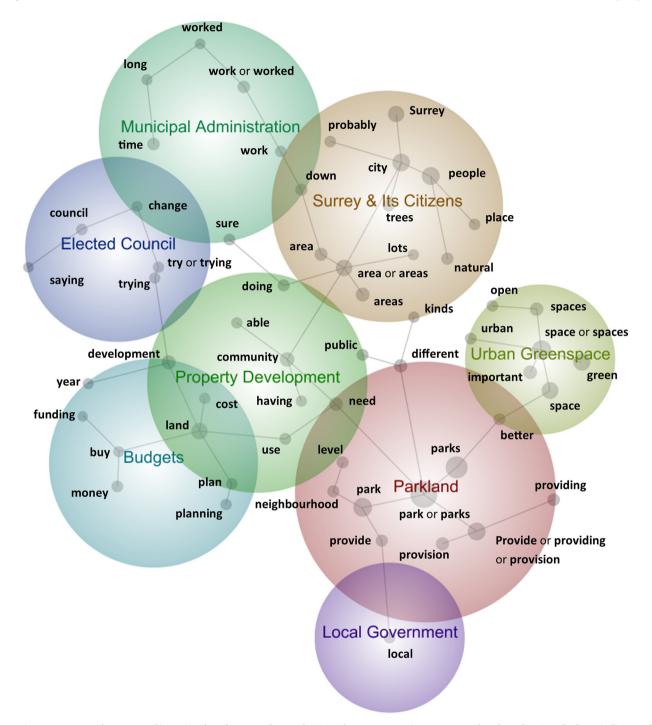


Fig. 5. Leximancer concept cluster map of interview data themes on factors shaping urban greenspace in Surrey, Canada, where the: size of spheres indicates relative frequency (count) of concepts within the text; sphere colour represents a heat map of relative importance (warm colours – red, brown, orange are associated with most important themes compared with cool colours – blues and greens); and arrangement of spheres represents the relative proximity of these concepts within the text (see Sotiriadou et al., 2014, p. 226). (For interpretation of the references to colour in this figure legend, the reader is referred to the digital version of this article.)

urban greenspace, but few reported the challenges with implementing the *Biodiversity Conservation Strategy*. Manager 1 contemplated: "it has been several years since the *Biodiversity Conservation [Strategy]* was approved... [however] there is still no financing strategy... I think there is... no political... will". Despite the abundance of governance tools for Surrey, land and funding are clearly essential to providing urban greenspace - factors to which we now turn our attention.

# 4.2.2. Financial resources for land acquisition

In accordance with the Local Government Act (Province of British

Columbia, 2015) municipalities are empowered to acquire land through development or by acquisition. Revenue to support new development with infrastructure including parkland is permissible as either 5% of a proposed sub-division land value or as Development Cost Charges (DCCs) which are:

monies that are collected from land developers by a municipality, to offset some of the infrastructure expenditures incurred, to service the needs of new development. Imposed by bylaw pursuant to the Local Government Act, the charges are intended to facilitate development by providing a method to finance capital projects related to roads, drainage,

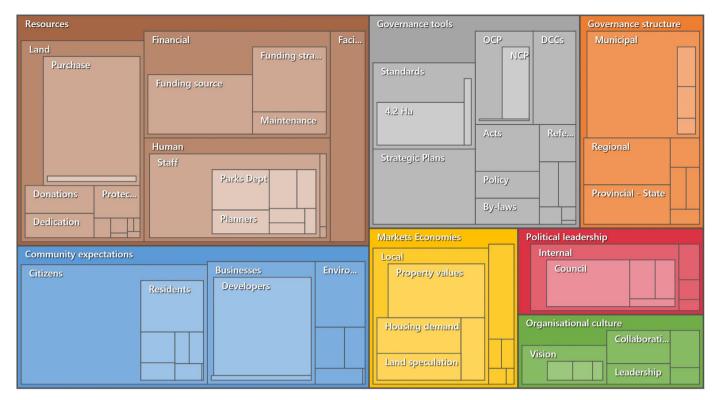


Fig. 6. NVivo coding frequencies from interviewees' transcripts reporting factors shaping urban greenspace in Surrey, Canada.

sewers, water and parkland (Province of British Columbia, 2005, p. v).

The intent of DCCs is to support infrastructure for new development, and despite clear guidelines from the province and council policy, several interviewees were unclear about how DCCs are being collected and applied, and how they can be, and are, used for urban greenspace provision. Some interviewees seemingly perceived that DCCs are either intended to be, or currently are the sole funding source for acquiring parkland. This included Executive Manager 1 and Community Representative 4 who held similar perspectives that development revenue collected could not keep pace with land acquisition to achieve an aspirational goal of 4.2 ha per 1000 residents. Having a generous supply of greenspace, and continuing to pursue more, comes at a significant cost. Surrey is challenged in finding the governance tools, financial and land resources to support new and important initiatives. For example, the Biodiversity Conservation Strategy and Greenways Plan seek to provide even more land (1400 to 1600 ha) for biodiversity, and for future neighbourhood parks in addition to the 2725-ha existing park system. Manager 7 revealed that these policies (the Biodiversity Conservation Strategy and the Greenways Plan) "all point to this need to acquire a lot of land for biodiversity purposes ... and yet council does [not] know how they are going to find the money for it". Elected Official 2 demonstrated that there is political awareness of the scope and scale of necessary future acquisition and while acknowledging funding as an impediment like the Managers, they offered a solution in the form of new charges and a levy "dedicated solely for the purpose of acquiring natural biodiverse parkland".

As a governance tool, DCCs are nested within a framework set by the *Local Government Act* and provide a source of revenue and land resources for municipalities, additional to property tax, donated land, and inter-governmental funding partnerships. DCCs are reviewed annually and are calculated based on residential dwelling units at the application phase of a proposed development and collected at either the sub-divisional approval or building permit stage depending on the type of development (City of Surrey, 2018a). DCCs are then retained

temporarily in a reserve fund to contribute to Council's capital works program (land acquisition and/or works) (Province of British Columbia, 2005). Unfortunately, just having the tools does not mean the revenue is sufficient or even available; it is a political decision to increase DCCs. Manager 7 and Officer 5 observed the dilemma facing elected officials between their desire to encourage development by keeping costs low and collecting enough revenue to provide the services required by that new development. The political decision to provide more revenue could soon exceed the authority of Surrey's elected council as it approaches its maximum borrowing capacity, requiring public approval. But can more revenue ever solve the problem? "The speed at which the land prices have changed... DCCs certainly do [not] increase in the same ratio and speed... [this] is the biggest barrier for us by far" (Officer 3). While DCCs were reported by Manager 3 and Manager 6 to be reviewed annually, Officer 3 and Officer 2 both suggested that due to the lag time between calculation and adoption to eventual collection and parkland acquisition (which could be at least five years), DCCs are still undervalued resulting in an under-funded parkland acquisition reserve. This is a strong indicator that the economy and markets are another significant factor in shaping Surrey's urban greenspace provision - the next factor we examine.

# 4.2.3. Property development in the lower mainland

Despite an annual parkland acquisition budget of approximately \$20 million acquiring 40–70 ha a year, Surrey's staff responsible for providing urban greenspace reported that there is still not enough money or land. Municipal resources are highly contested at the best of times. In the face of new and emerging global issues including the coronavirus pandemic (COVID-19), the International Monetary Fund predicts a record global recession (Gopinath, 2020) which means that financial resources for municipal greenspace provision will be under even greater pressure. As our interviews revealed, urban greenspace provision in Surrey is already highly impacted by the economy and markets at varying scales. At the heart of this issue is the pressure that comes with land speculation and investment both by developers and the local government itself. Interviewees reported market pressure

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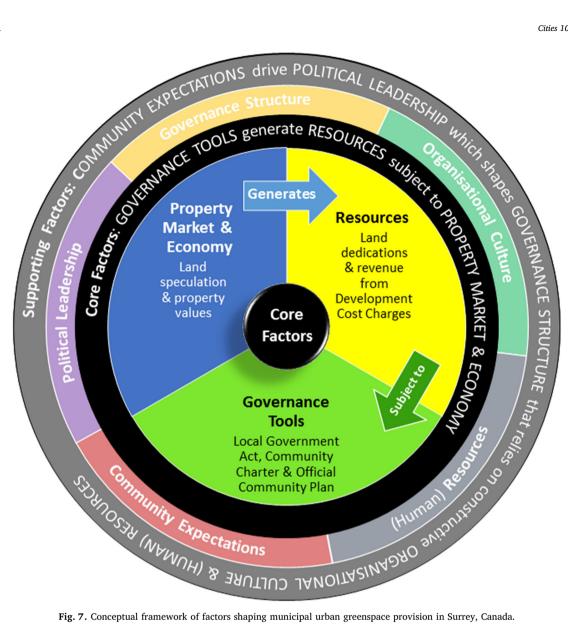


Fig. 7. Conceptual framework of factors shaping municipal urban greenspace provision in Surrey, Canada.

manifesting in multiple ways: as land speculation in anticipation of rezoning to high-density land-use - especially on the edge of the ALR, in developers' behaviour and capacity to negotiate better community outcomes during the planning process, and in the Council's seemingly hopeless pursuit to overcome Surrey's funding source and land acquisition program being out-paced by escalating land values. In response, the council undertook land-banking (acquiring land in areas where zoning will change, and land values will therefore increase). Community Representatives 1, 4 and 5 opined that this had further inflated local property values; conversely staff reported their frustration with limited funding for land acquisition preventing the City's practice of land-banking, reflected by Executive Manager 1 and Officer 2:

We were able to do a bit of land-banking, so we [would] go into areas of a city [that] we knew were developing in the future and try to buy property when it was super cheap, which is great in theory... [however] we just can[not]... even keep up with what we need to buy today. There [is] just no chance of land banking.

The very act of land-banking by land speculators, developers and the City of Surrey is pushing property values even higher. The result is that the city can no longer afford to participate in this activity.

Greater Vancouver's Agricultural Land Reserve provides both a challenge and an opportunity to developers and planners in the context of urban greenspace with the pressure of urban growth. Community Representative 1 reported investors using acquired lands for temporary uses such as golf courses, anticipating development opportunity through a modified Urban Containment Boundary. Likewise, Elected Official 2 acknowledged the financial gains for property owners concerned where Neighbourhood Concept Plans had been implemented adjoining the Agricultural Land Reserve. Among the interviewees, Elected Officials were especially aware of the pressure experienced by developers challenged to be flexible to provide greenspace contributions, when facing temporal and financial constraints associated with borrowed capital for real estate investment. Elected Official 2 explained "the pressure on them to fight the planning department for... dedication... becomes a battle for every inch because the margins... are so much tighter". Elected Official 1 offered "developments being approved that go... really cheek to jowl with existing green spaces... [cause] huge tension between the interests of the development industry and... the need to acquire parkland". Despite regional planners' intentions, pursuing more land within the Agricultural Land Reserve for future parkland coupled with neighbourhood planning adjacent to the urban containment boundary is adding to land value inflation. Officer 3 reported "areas in South Campbell Heights... [and] Hazelmere Escarpment... [are] both outside of the urban containment boundary... but the city is advancing applications to change that". The Agricultural

Land Reserve is at greater risk in light of Council's parkland acquisition adopting a land-banking approach. Interestingly, others have suggested that "ongoing pressure is what the ALR [Agricultural Land Reserve] is subject to and what it is designed to resolve" (Cameron, Harcourt, & Rossiter, 2007, p. 74).

The tensions around developer negotiations, land shortages, fiscal constraints, and untenable community expectations are driving the need for leadership and innovation in urban greenspace provision. Only two interviewees redefined greenspace to include parks, tree canopy, regional and provincial greenspace, and land for biodiversity. Manager 3 viewed parks and greenspace provision as a "matrix" that includes a collection of lands for biodiversity conservation and other city purposes, as well as private greenspace. Likewise, Manager 6 contemplated, "but as we densify... the pressure on... parks... we need to revisit... how that land is utilised and maximised for the use of it". The paradox of how local government officers approach urban greenspace provision is illustrated by the comments of Executive Manager 1 and Manager 3 about the dilemma of funding capital works versus maintenance perpetuated by pursuing more parkland. Manager 3 advised, "our [maintenance] funding is [not] increasing as quickly as our number of assets... our service levels are going to be dropping and... the public... blowback will get to a point where there [is] more pressure to increase taxes". Here Manager 3 alludes to the hidden costs of providing new parks; capital expenditure typically accounts for a minor portion of the whole-of-life cost of municipal assets which includes annual maintenance, operations, depreciation, and asset renewal. This point was further reinforced by Executive Manager 1 explaining the operational budget requests to support capital expenditure on urban greenspace: "we are not funded to the level that we would like". This means that acquiring more urban greenspace in pursuit of achieving a standard further contributes to the accumulating level of deferred green asset maintenance and renewal, the risk of existing asset deterioration, and eventual failure.

# 5. Responding to pressure: Surrey's aspirational goal for parkland

Our interviews revealed that there are practical challenges to pursuing an aspirational goal using a provision ratio. Pressure is mounting upon staff and their budgets with pursuing more land, despite evidence that the city cannot afford to maintain and replace existing assets or develop new ones. Elected officials, on the other hand, are under pressure to modify governance tools to facilitate development due to limited land resources for development within the regional urban containment boundary. While the pressures associated with factors at the core of urban greenspace provision for the City of Surrey - the property market and economies, natural and financial resources and governance tools - are building, they are not yet at a point of crisis: "the potential complete failure in the reproduction of systemic relations" (Gregory, Johnston, Pratt, Watts, & Whatmore, 2009, p. 120). In the context of municipal urban greenspace provision, the crisis is likely to be that phase when provision falls well short of community expectations. This is then the point when urban greenspace provision actions are highly reactive, urgent and expensive to implement. Thus the time to consider alternative approaches for providing urban greenspace is now - before the "blowback" (when the community reacts and demands political action to address the situation) - at a period when efforts can be proactive, considered, and implemented in an economical manner at a manageable pace.

Surrey's Official Community Plan acknowledges the value and role of the full spectrum of Surrey's greenspace resources, their opportunities, value, and the gaps but parkland acquisition remains a priority in pursuit of a provision ratio. British Columbia's Local Government Act provides opportunity and potentially more flexibility to deliver urban greenspace, providing that "the assessment of the need for and enjoyment of park and open space by the different land uses must be justified" (Province of British Columbia, 2005, p. 2.13). DCCs can be used

for providing parkland acquisition and improvement as well as drainage facilities (Province of British Columbia, 2005). This points to a problem with naming greenspace "parkland" and the assumptions that come with it about being mostly for recreation. Surrey is seemingly limiting itself and its powers to maximise the use of DCCs. This further presents a risk that the city is missing opportunities to address the emerging dilemma of an unfunded Biodiversity Conservation Strategy. As Surrey has yet to provide a funding strategy to implement their Biodiversity Conservation Strategy, there is a risk of community perception that the city is not planning with "authenticity", or in a democratic manner, representing public expectations (Zukin, 2010, p. 128) - in this case, endorsing a plan without providing a budget to support its delivery. Community Representative 4 revealed this sentiment when discussing the role of this plan in decision-making: "[Environmental] activists ... have a very high level of frustration of how planning processes are going in the city when it comes to trying to protect these significant

The unfunded Biodiversity Conservation Strategy requiring even more land is further adding to the pressure on the City's financial resources and elected officials to demonstrate their commitment and interest in delivering this strategy. The demands from environmental groups to repurpose parkland acquired for recreation/sport to parkland for conservation purposes in order to retain tree canopy is increasing the pressures on the City's parkland acquisition program. Surrey is experiencing a widening resource gap between available land and funds - a situation unlikely to change in the short to medium term when global markets and the economy influence the city's growth and urban greenspace provision. This resource gap will add to the widening gap between population and parkland growth rates (see Fig. 3). Within this context, striving for a provision ratio of 4.2 ha per 1000 residents does have some benefits overall, but seems highly problematic - especially for Surrey when 1) there is already an abundance of other types of greenspace that is not factored into these calculations. 2) according to our interviewees, this standard is not likely to be realised into the future, and 3) the local government is financially under-resourced to develop and maintain even its already acquired greenspace to the standard expected by its citizens. The drawback of concentrating available financial resources for acquiring more parkland is that Surrey has less resources to improve the quality of urban greenspace by developing, maintaining and improving parkland and facilities. Less parkland acquisition could therefore provide more quality urban greenspace, providing that it can be distributed to ensure equitable

The key lessons for urban greenspace policymakers, practitioners, and researchers revealed through the examination of the challenges facing Surrey, are instructive for considering alternative approaches concerning the core factors identified by our research. For instance, governance tools should be developed and implemented in a more collaborative and coordinated manner across all levels of government to ensure that communities are provided with an adequate quality and quantity of urban greenspace with equitable access, and critically, commensurate with current and future needs. For example, stakeholders from municipal, regional, and provincial levels should be collaborating on policy development and amendments to address emerging concerns such as Surrey's flexibility in applying Development Cost Charges to help realise the City's Biodiversity Conservation Strategy. Drawing on the insights about financial and natural resources, urban greenspace provision must also be conceived and delivered in a manner that optimises existing land resources first and foremost, to sustainably support the broad spectrum of urban greenspace functions, and embraces whole-of-life asset management. This could incorporate informal urban greenspace, street landscape, and cemeteries for instance, within Surrey's urban greenspace inventory. Finally, those responsible for urban greenspace provision must optimise the opportunities presented by property markets and changing economic conditions in an economically, environmentally, and socially sustainable manner. This

might incorporate Council's collaboration with the development industry to identify innovative opportunities for urban greenspace provision in the form of green roofs, green walls, enhanced street trees, and landscape areas (including water sensitive urban design infrastructure). Adopting these principles may in fact offer a starting point in realising a better approach to providing urban greenspace as an alternative to simply pursuing more parkland.

## 6. Conclusions

We commenced this paper by identifying concerns about how approaches to urban greenspace provision are attuned (or not) to the contemporary political, economic, social, and environmental challenges facing cities. We sought to answer two questions: 1) what factors shape urban greenspace provision at the local scale? And 2) how are these factors resolved? In the first instance, our research has identified a range of factors that shape urban greenspace provision by examining the case of Surrey, BC. Surrey is one of Canada's fastest growing cities, with a population on track to reach almost 800,000 before the middle of the 21st century. Surrey has been provided a bounty of urban greenspace through a legacy of urban planning initiatives at multiple levels of government and financial resources to acquire new parklands; but funding for acquiring urban greenspace to support biodiversity conservation and to develop and maintain existing urban greenspace is still scarce.

We have revealed that for a city experiencing pressures of rapid growth, three factors are at the heart of urban greenspace provision: governance tools, financial and natural resources, and economies and property markets. The lessons from our Surrey case illustrate the relevance of timing: property development is relative to market demand, which means that delivering urban greenspace requires infrastructure (not just land) to support the needs of the existing community. Our case study has generated valuable insights about the complex systems and processes that determine when and how resources are allocated for urban greenspace provision, within the constraints of competing municipal services and infrastructure, such as roads and stormwater. The central argument to this paper is that the current approach to urban greenspace provision of relying upon governance tools does not acknowledge the challenges of supplying urban greenspace. This is a complex dilemma and one not simply resolved by marshalling more resources to meet demand or just preparing a policy/plan. The contributions of our research are manifold: 1) it reveals supply side insights of local government planners, managers, and decision makers on the challenges of urban greenspace provision; 2) it examines an important knowledge gap in the research to date with understanding the quandaries of non-capital, mid-sized cities experiencing rapid growth; and 3) it reveals the range of factors that shape urban greenspace and how they operate in this context.

The framework of (core) factors and how they manifest in this case is an innovative and important contribution that illustrates insights from key actors within local government. The implications for urban greenspace policy, practice, and research are that urban policy and planning approaches need to be cognisant of these factors, how they differ spatially and temporally, and facilitate local variance for planning to be effective. As core factors, governance tools, property markets and economies, and natural and financial resources are closest to municipal urban greenspace provision, particularly parks (Fig. 5). Changing the approach to urban greenspace provision starts here and it is this new insight that is novel and contributes to the literature. There is another set of factors that helps shape urban greenspace - the supporting factors which also need to be examined: community expectations, political leadership, governance structure, human resources, and organisational culture (Fig. 7). The relevance, complexity, and depth of these factors suggest that they too play an important role in shaping urban greenspace provision; a role that warrants further examination to fully appreciate the complexity of urban greenspace provision, not only in Surrey but in rapidly growing cities globally. What are the community expectations – especially those of developers and residents – and how are these influencing urban greenspace provision? Does this provide additional pressure? This task is too complex to appropriately examine in depth and within the limitations of this paper. It is imperative that future research examine not only how these supporting factors shape urban greenspace provision in different contexts, but critically explores developers' perspectives and experiences as key stakeholders.

While Surrey may seem unique in its specific human geography, its European history, and concentration of new residents determined by current immigration from South Asia, means that the city also shares similarities with other mid-sized cities grappling with rapid population growth, urban densification, and the desire to secure more urban greenspace. Canadian cities are not alone in confronting the challenges of managing rapid urban growth and delivering urban greenspace to support the needs of healthy communities; challenges further compounded by the COVID-19 pandemic when countries with advanced economies - including Canada - are facing major economic downturns predicted at > 6% (Gopinath, 2020). The characteristics and interrelationships of these core factors (economies and markets, limited resources, and governance tools) exert pressure on the approach to urban greenspace provision. It is important that this phenomenon is examined and understood in the local context; these factors vary both spatially and temporally. During a global crisis of lock-down and social distancing measures in response to the COVID-19 pandemic, provision of adequate urban greenspace to support citizens' mental and physical health and well-being is more important than ever before (Beck, Giles-Corti, & Ivers, 2020; Mell, 2020). Understanding these factors should help unlock innovative solutions to optimise all urban greenspace and achieve broader ecosystem services and benefits that we have come to expect from them, rather than persisting with planning tools that principally target one type of urban greenspace (i.e. recreational parks). We need solutions that are cognisant of ongoing whole-of-life asset costs associated with development, facility maintenance, and renewal, and resilient to economic downturns that apply increased pressure on contested municipal financial resources. This is essential to sustainable urban greenspace provision. Simply allowing the pressure to build and being complacent about the need to change the greenspace provision approach to one that can be adequately resourced (financially) to meet the spectrum of a city's natural greenspace needs, may compromise the greenspace legacy of tomorrow's cities.

# CRediT authorship contribution statement

Chris Boulton: Conceptualization, Methodology, Investigation, Data curation, Project administration, Funding acquisition, Writing - original draft. Aysin Dedekorkut-Howes: Conceptualization, Supervision, Writing - review & editing. Meg Holden: Writing - review & editing, Validation. Jason Byrne: Conceptualization, Writing - review & editing.

# **Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary material

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